

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 10

Remarks:

The amendments and remarks presented herein are believed to be fully responsive to the Office Action dated April 8, 2008.

Claims 50-52, 56, 58, 61, 67 and 92-109 are pending in the application. Claims 50, 51, 58, 62, 92, 99, 102 and 105 have been amended as set forth above. The amendments are fully supported in the specification and drawings as originally filed. No new matter has been added.

CLAIM REJECTIONS

Claims 50, 52, 56, 58, 61 and 67 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, U.S. Patent No. 5,289,321, in view of Narendra et al., U.S. Patent No. 4,855,822, while claim 51 was rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Narendra et al., and in further view of Tuck, U.S. Patent No. 4,772,942. Claims 92-99 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Tuck, while claims 100-109 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Tuck, and in further view of Kishi et al., U.S. Patent No. 5,414,461.

Applicants respectfully traverse the rejections under 35 U.S.C. §103(a). However, and without acquiescing in the rejections in any manner and solely to expedite prosecution and allowance of the claims, Applicants have clarified independent claims 50, 92, 99, 102 and 105 and submit that the present claims are in condition for allowance for at least the reasons set forth below.

Applicants have amended independent claim 50 to clarify that the vehicle is equipped with an image processor and a display screen displaying the synthesized image, with the display screen viewable by a driver of the vehicle when the driver is normally operating the

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 11

vehicle. Dependent claims 51, 58 and 62 have been amended to correspond with the clarification of claim 50.

Applicants have amended independent claim 92 to clarify that the display system displays the composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. Independent claims 99, 102 and 105 have been clarified in a similar manner.

Rejection of Independent Claim 50

With respect to the rejection of independent claim 50, Applicants submit that the combination of Secor and Narendra et al. does not disclose or suggest or render obvious the claimed vision system. In stark contrast to the systems of Secor and Narendra et al., the presently claimed invention of claim 50 provides a vision system having at least two image capture devices with overlapping fields of view, an image processor that produces a synthesized image from the outputs of the at least two image capture devices, and a display screen that displays the synthesized image and that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, and wherein the image processor processes the outputs by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation. Neither Secor nor Narendra et al. discloses or suggests such a system. For example, neither Secor nor Narendra et al. discloses a vehicle having at least two image capture devices with overlapping fields of view. Nor does either Secor or Narendra et al. disclose or suggest, for example, an image processor that produces a synthesized image from the outputs of at least two image capture devices. Moreover, Applicants submit that both Secor and Narendra et al. teach away from such a vision system, as discussed below.

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 12

Secor discloses a vehicle having multiple cameras. Contrary to the statement in the Office Action that the side cameras of Secor have an overlapping field of view, Applicants submit that column 4, lines 13-22 of Secor does not teach such a configuration of cameras, but instead teaches that the side cameras are "oriented sideways, that is, in the direction transversed to the traveling direction." Secor further teaches that "this arrangement provides a view to the side of the vehicle, which can be enormously useful when backing out of a narrow parking spot into a busy or dangerous street, or where there are small children in the vicinity." See column 4, lines 15-22 of Secor. Thus, Applicants submit that Secor teaches that the cameras are directed sideways (away from one another), and thus teaches away from a vision system having at least two image capture devices with overlapping fields of view.

Further, the Office Action acknowledges that Secor does not disclose the synthesized image as claimed, and cites to Narendra et al. to support the rejection. However, Applicants submit that Narendra et al. does not disclose or teach or render obvious the claimed invention. Narendra et al. discloses a system for interactive, real time tele-operation of a driverless robotic vehicle. The system of Narendra et al. includes a single television camera mounted on the vehicle at the highest possible point on the vehicle (see column 7, lines 4-5 of Narendra et al.). The Narendra et al. system samples or grabs frames from the camera at a low rate, such as one frame every one to three seconds, and the system uses vehicle position and attitude data continuously transmitted from the vehicle to transform (via a processor remote from the vehicle) the single frame images or snapshots into virtual real time video images. Thus, the remote operator of the Narendra et al. system may view a display that presents images that have the appearance of continuous video by extrapolating between the snapshots. Thus, Narendra et al. teaches away from the presently claimed invention by teaching the use of a single camera and remotely processing snapshots to create an appearance of continuous video.

Moreover, Applicants further submit that Narendra et al. teaches away from the presently claimed invention by teaching a remote operated robotic vehicle. Such a vehicle would

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 13

not be equipped with a display screen displaying a synthesized image, with the display screen viewable by a driver of the vehicle when the driver is normally operating the vehicle. Thus, there would be no motivation or suggestion to one of ordinary skill in the art to combine the teachings of the robotic vehicle system of Narendra et al. with the rear view camera and display system of Secor.

Further, Applicants submit that Narendra et al. does not disclose or suggest an image processor that processes outputs by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation. The Office Action cites to column 9, lines 10-40 of Narendra et al. for support of the assertion that Narendra et al. discloses producing a synthesized image from the outputs of the image capture devices by performing image warping. However, the "warp processor" disclosed in Narendra et al. merely functions to transform the snapshots or frame data (captured by a single camera) into real time images having the desired perspective. There is no disclosure or suggestion in Narendra et al. of processing outputs of at least two image capture devices by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation.

Therefore, Applicants respectfully submit that the combination of Secor and Narendra et al. does not disclose or suggest or render obvious the vision system of the presently claimed invention, particularly as set forth in independent claim 50 and the claims depending therefrom. Reconsideration and withdrawal of the rejection of claims 50-52, 56, 58, 61 and 67 is respectfully requested.

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 14

Rejection of Independent Claim 92

With respect to the rejection of independent claim 92, Applicants submit that the combination of Secor and Tuck does not disclose or suggest or render obvious the claimed vision system. Secor does not disclose, for example, a vision system with a display system displaying a composite image (synthesized from outputs of at least two image capture devices) on a single display screen of the vehicle that is viewable by the driver of the vehicle. To the contrary, Secor discloses a plurality of LCD screens (40, 42, 44), with each screen displaying a view from the respective camera. Thus, Secor teaches away from presently claimed invention of independent claim 92. Further, the Office Action acknowledges that Secor does not disclose a synthesized image and non-parallel axes as claimed, and cites to Tuck for support of the rejection.

Tuck discloses a display system for a tank that includes individual display units mounted side-by-side, each having a respective television camera associated therewith so that a substantially continuous picture of at least part of the surrounding panorama can be reconstructed and viewed by an observer. See the Abstract and Figure 3 of Tuck. Applicants submit that Tuck does not disclose or suggest a vision system having, for example, a display system that displays a composite image synthesized from outputs of at least three image capture devices, with the display system displaying the composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, and with the displayed image including an image portion from each of the image capture devices. Moreover, Applicants submit that Tuck teaches away from such a vision system by teaching that each of the individual display units has a respective television camera associated therewith, such that images captured by each television camera are displayed on their associated display unit such that the displayed image on one of the individual display units cannot have an image portion from each of the image capture devices.

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 15

Therefore, Applicants respectfully submit that the combination of Secor and Tuck does not disclose or suggest or render obvious the vision system of the presently claimed invention, particularly as set forth in independent claim 92 and the claims depending therefrom. Reconsideration and withdrawal of the rejection of claims 92-98 is respectfully requested.

Rejection of Independent Claim 99

With respect to the rejection of independent claim 99, Applicants submit that the combination of Secor and Tuck does not disclose or suggest or render obvious the claimed vision system for at least the reasons set forth above with respect to the rejection of independent claim 92. Reconsideration and withdrawal of the rejection of independent claim 99 and claims 100 and 101 depending therefrom is respectfully requested.

Rejection of Independent Claim 102

With respect to the rejection of independent claim 102, Applicants submit that the combination of Secor and Tuck and Kishi et al. does not disclose or suggest or render obvious the claimed vision system for at least the reasons set forth above with respect to the rejection of independent claim 92. Reconsideration and withdrawal of the rejection of independent claim 102 and claims 103 and 104 depending therefrom is respectfully requested.

Rejection of Independent Claim 105

With respect to the rejection of independent claim 105, Applicants submit that the combination of Secor and Tuck and Kishi et al. does not disclose or suggest or render obvious the claimed vision system. As discussed above, neither Secor nor Tuck disclose or suggest, for example, a vision system for a vehicle having a gear actuator and comprising at least two image capture devices positioned on the vehicle and directed rearwardly with respect to the direction of

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 16

travel of the vehicle, with a display system that displays a composite image synthesized from outputs of the image capture devices, and with the display system displaying the composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. Likewise, Kishi et al. does not disclose or suggest such a vision system. Further, Applicants submit that the combination of Secor and Tuck and Kishi et al. does not disclose or suggest or render obvious such a vision system having, for example, an electronically generated graphic overlay that enhances the driver's understanding of what is in the area adjacent the vehicle, and that is seen superimposed on the displayed composite image, and with the graphic overlay enabled when the vehicle's gear actuator is selected to be in reverse gear. Reconsideration and withdrawal of the rejection of independent claim 105 and claims 106-109 depending therefrom is respectfully requested.

Accordingly, Applicants respectfully submit that Secor and/or Narendra et al. and/or Tuck and/or Kishi et al., either alone or in combination with one another or with any other prior art of record, do not disclose, teach, suggest or render obvious the vision system of the present invention, particularly as set forth in independent claims 50, 92, 99, 102 and 105 and in the claims depending therefrom.

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 10/643,602
Page : 17

Applicants respectfully submit that claims 50-52, 56, 58, 61, 67 and 92-109 are in condition for allowance and a notice to that effect is earnestly and respectfully requested.

Respectfully submitted,

KENNETH SCHOFIELD ET AL.

By: Van Dyke, Gardner, Linn & Burkhart, LLP

Date: April 25, 2008.



Timothy A. Flory
Registration No. 42 540
2851 Charlevoix Drive, S.E., Suite 207
P.O. Box 888695
Grand Rapids, Michigan 49588-8695
(616) 975-5500

MAG04 P-1087